Memorandum

To: DISTRICT DIRECTORS
DISTRICT DIVISION CHIEFS for
Design, Maintenance, and
Traffic Operations
ALL HOLDERS OF THE HIGHWAY DESIGN MANUAL
ALL HOLDERS OF THE TRAFFIC MANUAL

Date: September 18, 2001

File: 608

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF DESIGN

Subject: Approval and Exception Process for Design Information Bulletin 82

The attached Design Information Bulletin (DIB) 82, "Pedestrian Accessibility Guidelines for Highway Projects," is a design guide to comply with existing State and Federal laws that provide accessibility to people with disabilities. This DIB, together with a recently acquired delegation from the Division of the State Architect (DSA), allows the Department of Transportation (Department) to categorically approve certain highway construction contracts with pedestrian facilities without DSA approval before award of the contract.

This categorical approval authority will apply to highway construction contracts, excluding buildings. Building projects shall continue with the existing process of obtaining DSA approval through the Division of Engineering Services, Structures Design, Office of Transportation Architecture.

All projects that do not meet the State or Federal accessibility requirements as contained in DIB 82 will require an exception. Exceptions to accessibility standards must be reviewed by the Design Reviewer or the Project Development Coordinator assigned to your district. The date of this review shall be part of the information transmitted to headquarters included in cases 2 or 3 below. Approval of projects with pedestrian facilities (sidewalks, curb ramps, overcrossings or undercrossings with sidewalks, or other facilities intended for pedestrians) shall fall within one of the cases below (cases 2 and 3 may be combined). Projects without pedestrian facilities do not need to follow these guidelines.

Case 1. Projects with pedestrian facilities that do not require an exception—The Department's approval of the project plans and specifications (PS&E) will occur when the district submits their PS&E to headquarters Office Engineers for Ready-to-List (RTL). In the case of a Minor B project, approval occurs at the completion of the Form FA47 as the Expenditure Authorization Project Report. For encroachment permit (up to $1,000,000) or special funded projects, the approval will occur at the issuance of the encroachment permit. The required Attachment A (see *PS&E Guide*) has an item to record that the "State and Federal Americans with Disabilities Act requirements have been incorporated into this project." Before PS&E submittal to headquarters Office Engineers (or before an encroachment permit is issued, if

applicable), the Responsible Charge Engineer shall submit an electronic file of the plans pertaining to pedestrian facilities to the Office Chief of Geometric Design Standards in headquarters at the e-mail address "Design 53 ADA" in Lotus Notes (listed alphabetically under ADA). Indicate in the subject field of the e-mail "No Exception" followed by the District-EA.

Case 2. Projects that need an exception to a State accessibility standard—Follow the DIB procedures and submit exception information in the e-mail and attach plans in JPEG format. Only the plan sheets showing the subject pedestrian facilities should be submitted. Include necessary plan, profile and elevation views to illustrate the condition requiring the exception. This information shall be transmitted to the Chief, Office of Geometric Design Standards in headquarters, who will comment and/or approve the request for exception to State Standards. Headquarters' reply to the sender will indicate approval and/or comment. Use the e-mail address "Design 53 ADA" and indicate in the subject field of the e-mail: "Exception to State Std" followed by District-EA.

Case 3. Projects that need an exception to a Federal accessibility standard—Follow the DIB procedures and submit exception information in the e-mail and attach plans in JPEG format. Only the plan sheets showing the subject pedestrian facilities should be submitted. Include necessary plan, profile and elevation views to illustrate the condition requiring the exception. This information shall be transmitted to the Chief, Office of Geometric Design Standards in headquarters, who will review and concur with the district before forwarding to DSA. DSA will provide comments and/or approve the request for exception to Federal standards, which will be returned to the district. Use the e-mail address "Design 53 ADA" and indicate in the subject field of the e-mail state: "Exception to Federal Std" followed by District-EA.

All MicroStation plans or plans from other sources should be printed half size (11"x 17") and scanned (200 dpi) in JPEG format. Assistance from District Design may be required to create a JPEG file of the pertinent encroachment permit plans.

The e-mail subject field shall contain the district, hyphen, EA number, e.g., 03-943210. In the case of an encroachment permit project, use the first two digits of the permit number assigned (district number), hyphen, next two digits of the permit number (year assigned), then the last four digits of the permit number, e.g., 12-010009.

For projects falling under Case 3 above, DSA may make comments on the JPEG file. These comments must be resolved and changes incorporated in the plans before RTL (or before encroachment permit issuance, if applicable). DSA's review should take place within two weeks

of receipt from headquarters. It shall be the responsibility of the Responsible Charge Engineer to obtain final approval of plans before completing final PS&E.

DSA will conduct after-the-fact spot checks of plans falling under Cases 1 and 2 above on a random basis, as an audit of the Department's compliance with this delegation. DSA's spot check should take place within four weeks after receipt of the Department's monthly electronic transmittal of categorical approvals. Since DSA is entitled to fees for the plan review function they perform in either of the three cases, their fees will be invoiced through headquarters and paid from the district's capital outlay support for the specific project. Their rate will be on an hourly basis up to the total hourly rate of a Senior Architect.

Projects on State highway right-of-way constructed by others, encroachment permit or special funded projects, are also subject to this DIB. However, encroachment permit projects will not incur fees for time spent by DSA by this delegated procedure, since there is no capital outlay support.

Please note: in compliance with State law, for all encroachment permit or special funded projects with State funds participating in the construction, the project sponsor shall be referred to work directly with DSA for accessibility approval and fee payment to DSA before an encroachment permit is issued.

District training for DIB 82 and these instructions will be forthcoming as soon as can be arranged.

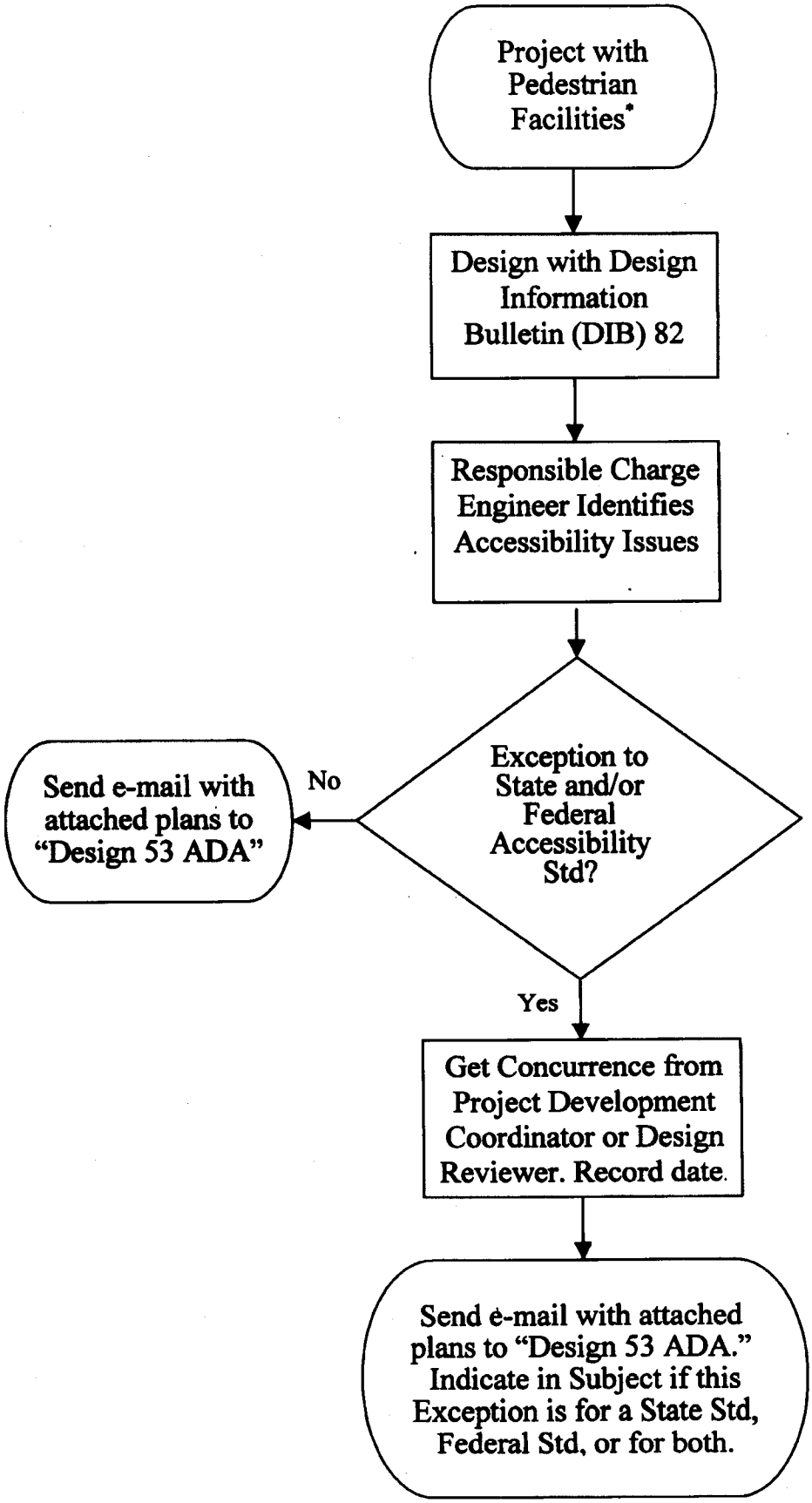
If you have any questions, please contact your Project Development Coordinator, Design Reviewer, or David Cordova at (916) 653-0485.

KARLA SUTLIFF
Acting Chief
Division of Design

Attachment

c: Project Development Coordinators
Design Reviewers

FLOW CHART FOR DISTRICTS TO IMPLEMENT DIB 82



*Sidewalks, curb ramps, overcrossings or undercrossings with sidewalks, or other facilities intended for pedestrians.

Examples of ADA Design Submittals

Example 1

A Project Engineer has a project where pedestrian accessibility will be constructed. As part of the environmental approval and mitigation process, public access to a beach will be constructed from State Route 1 in Ventura County.

No ADA exceptions are needed for this project. Therefore, no need to obtain a review from the Design Reviewer or the Project Development Coordinator.

The Project Engineer will e-mail the title sheet and other pertinent sheets in JPEG format that describe the pedestrian accessibility facilities to "Design 53 ADA." The e-mail subject used is "No Exception 07-459500." This submittal will be subject to DSA's after-the-fact spot check.

When submitting PS&E to headquarters Office Engineers, the "Yes" box is checked in the Americans with Disabilities Act (ADA) section of the standard Attachment A. This constitutes Caltrans categorical approval delegated from the State Architect's office.

Example 2

An Oversight Engineer has an oversight project with the City of Folsom to reconstruct an interchange at Highway 50. The overcrossing sidewalk grade in the design exceeds 5% and turns 180 degrees at the westbound on-ramp without a landing.

A landing is a Federal requirement for a ramp every 760 mm rise. The landing must be at least 1.5 m long (Federal requirement) and 1.8 m long (State requirement) for intermediate and bottom landings that change directions more than 30 degrees. The City project engineer identifies the issue of not providing a landing to the Caltrans Oversight Engineer. The City's project engineer writes an information sheet that describes the project, cites the subject Federal accessibility standard, and reason for an exception.

The Oversight Engineer requests a review by the Project Development Coordinator, who agrees with the need to obtain an exception to a Federal accessibility standard. The Oversight Engineer e-mails the information sheet, title sheet and other pertinent sheets in JPEG format that describe the issue to "Design 53 ADA." The e-mail subject used is "Exception to Federal Std 03-428800."

The Office Chief of Geometric Design Standards reviews the request and concurs. The e-mail is forwarded to the State Architect's office for review. The State Architect's office says that a landing must be provided where it turns 180 degrees. However, a landing will not be required on the overcrossing itself since it follows the grade of the roadway. This decision is forwarded back to the district for incorporation into the design.

This decision is the approval from the State Architect's office with the conditions in the reply. The Oversight Engineer will e-mail the title sheet and other pertinent plans of the rest of the pedestrian facilities not related to the exception request, in JPEG format, to "Design 53 ADA". The e-mail subject used is "No Exception 03-428800." This submittal will be subject to DSA's after-the-fact spot check. Caltrans categorical approval of the rest of the pedestrian facilities not related to the exception request will occur with the PS&E submittal to headquarters Office Engineers with the Attachment A, and the ADA box checked "Yes."

State of California Business Transportation and Housing Agency

Memorandum

To: DISTRICT DIRECTORS
DISTRICT DIVISION CHIEFS for
Design, Maintenance, and
Traffic Operations
ALL HOLDERS OF THE HIGHWAY DESIGN MANUAL
ALL HOLDERS OF THE TRAFFIC MANUAL

Date: September 7, 2001

File: 608

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF DESIGN
Mail Station 28

Subject: Design Information Bulletin 82, "Pedestrian Accessibility Guidelines for Highway Projects"

PURPOSE

To provide highway design guidelines for facilities which accommodate people with disabilities.

BACKGROUND

The Americans with Disabilities Act (ADA) of 1990, along with it's implementing regulations, and the California Government Code Sections 4450 et seq. prescribe that facilities shall be made accessible to persons with disabilities.

The Federal Highway Administration has reaffirmed that the *Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities* (ADAAG) shall apply to the design of Caltrans facilities under title II of the ADA, which applies to the operations of State and local governments. Other Federal guidance's particular to accessible pedestrian facilities in public right of way were used to develop this Design Information Bulletin (DIB). Title 24 of the California Code of Regulations prescribes the accessible design standards, and includes the *California Building Code*. This DIB presents the Federal and the State requirements into a workable set of design standards.

These guidelines are intended to apply to highway projects on the State highway system, although, they could apply to other projects within Caltrans' right of way as well. Temporary facilities during construction must also comply with these guidelines. These guidelines are not intended to apply to building projects. Also, pedestrian accessibility as part of traffic signalization for the visually impaired is not covered by this DIB.

DEFINITIONS

For the purpose of these guidelines, the following definitions will apply:

Accessible Route: A continuous, unobstructed path connecting all accessible elements and spaces of a building or facility. (ADAAG)

Element: An architectural or mechanical component of a building, facility, space, or site, e.g., telephone, curb ramp, door, drinking fountain, seating, or water closet. (ADAAG)

Facility: All or any portion of buildings, structures, site improvements, complexes, equipment, roads, walks, passageways, parking lots, or other real or personal property. (ADAAG)

Historical resource/property: Under State law, the term is "historic resource" and includes any building, structure, site, object or district that is either:

- listed in or eligible for listing in the National Register of Historic Places,
- listed in or eligible for listing in the California Register of Historical Resources,
- has been identified as significant for purposes of California Environmental Quality Act (CEQA) by a lead agency (like Caltrans) because it meets the eligibility criteria of the California Register,
- is listed in a local register of historical resources, or
- has been identified as significant in an historical resource survey meeting the California Office of Historic Preservation's standards.

Under Federal law, the term is "historic property" and includes any building, structure, site, object or district that is listed in or eligible for listing in the National Register of Historic Places. (State definition: CEQA Guidelines 15064.5 and Public Resources Code 5020. Federal definition: 36 CFR 800.16(l).)

Path or Pathway: A track or route along which people are intended to travel. (*Designing Sidewalks and Trails for Access*)

Pedestrian: A person who travels on foot or who uses assistive devices, such as a wheelchair, for mobility. (*Designing Sidewalks and Trails for Access*). This would include a person with a disability.

Person with Disability: An individual who has a physical impairment, including impaired sensory, manual or speaking abilities, that results in a functional limitation in gaining access to and using a building or facility. (California Code of Regulations Title 24)

Sidewalk: A surfaced pedestrian way contiguous to a street used by the public. (California Code of Regulations Title 24). See the discussion under "Surface" of these guidelines.

Structurally Impracticable: Rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features. (ADAAG)

Technically Infeasible: An alteration that has little likelihood of being accomplished because existing physical or site constraints prohibit modification or addition of elements, spaces, or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility. (ADAAG)

Walk or Walkway: An exterior pathway with a prepared surface intended for pedestrian use, including general pedestrian areas such as plazas and courts. (ADAAG). This would include sidewalks and curb ramps.

APPLICABILITY

Accessible pedestrian facilities should be considered on all projects where pedestrians are permitted.

All resurfacing, restoration, and rehabilitation (RRR) projects and any project for construction of new, or alteration of existing facilities that affects pedestrians shall be designed in accordance with these guidelines. Capital Preventative Maintenance (CapM) projects, preventative maintenance, or routine maintenance work may be designed with these guidelines, but are not required.

New Construction

Each facility or part of a facility constructed on State right of way shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by individuals with disabilities.

Alterations

Each facility or part of a facility altered on the State highway system in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities.

No alteration shall be undertaken which decreases or has the effect of decreasing accessibility or usability of a facility below the requirements for new construction at the time of alteration.

Minimum Accessibility

Newly constructed or altered highways (including RRR projects) must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to a street level pedestrian walkway.

To the maximum extent feasible, at least one accessible route must be provided from one facility to another. If a more direct route exists that is not an accessible route, the accessible route must be in the same vicinity as the other route.

Whether the project is for new construction or for alteration of an existing facility, full compliance with the design standards contained herein are not required where it can be demonstrated that it is structurally impracticable (for new construction) or technically infeasible (for alterations) to meet the requirements. See "Review and Exceptions" of these guidelines. Any portion of the facility which can be made accessible to persons with disabilities shall comply to the extent that it is not structurally impracticable. Also, any elements or features of the facility that are being altered and can be made accessible shall be made accessible within the scope of the alteration.

Historic Preservation

In meeting the aforementioned requirements of "Minimum Accessibility," a design that would threaten or destroy the historic significance of a historical resource/property should not be constructed. Historical resource/property is any property listed or eligible for listing in the National Register of Historic Places, or properties designated as historic under State or local law. The district Heritage Resources Coordinator shall be consulted to determine whether the project might impact a historical resource/property. Nonconstruction strategies may be an option. See "Program Accessibility" of these guidelines.

Accessible routes from an accessible entrance to all publicly used spaces on at least the level of the accessible entrance shall be provided.

A lesser standard in walkway design shall conform to historic preservation standards under "Pedestrian Facilities" and "Ramps." Also, the State Historic Building Code shall apply if the project will affect a qualified historical building or property.

REVIEW AND EXCEPTIONS

Headquarters' review of projects by the Design Reviewers or the Project Development Coordinators will include highway projects with pedestrian facilities.

Request for exceptions to provide less accessibility than "State" standards must be in writing and include a description of the project, the subject standard, and reason for exception. Exceptions

may only be granted by the Chief, Office of Geometric Design Standards[1]. Request for exceptions to provide less accessibility than "Federal" standards must be forwarded to the Chief, Office of Geometric Design Standards and must include a description of the project, the subject Federal standard, and reason for exception that supports either a structurally impracticable or technically infeasible situation. The Chief, Office of Geometric Design Standards or designee will work with the State Architect's office for their determination of an approval or denial. All requests for exceptions must be concurred by the District Division Chief for Design or designee.

The request for exception from State or Federal standards must include the reason why the facility or element is whole or in part structurally impracticable (for new construction) or technically infeasible (for alterations) to meet the requirements.

This documentation will be part of the project files. Also, documentation will be needed if it is decided to not use a Federal standard in favor of another lesser Federal standard.

Special funded and encroachment permit projects will also be subject to these exception procedures, but not if State funds participate in the project. The sponsor of a project having pedestrian facilities, and with participating State funds, must obtain approval from the State Architect's office as required by law. The State architect's office will provide direct input to the project sponsor, and will stamp their approval on the plans.

PEDESTRIAN FACILITIES

Vehicular lanes and shoulders are not required to be designed as accessible pedestrian routes even where it is legal for a pedestrian to traverse along a highway. As a community grows, and the presence of pedestrians become prevalent, highway improvements that include pedestrian facilities should be considered as part of a highway project.

Deciding to construct pedestrian facilities and elements where none exists is an important consideration. In built-up urban areas with pedestrians present, pedestrian facilities should be constructed. In rural areas where few or no pedestrians exist, it would not be reasonable or cost effective to construct pedestrian facilities. For situations between these two extremes the designer should consult with the affected local agency, and special interest groups. Any decision made should be clearly documented in the project files.

All pedestrian facilities proposed within Caltrans' right of way shall follow the guidance in Chapter 31 "Nonmotorized Transportation Facilities" in the *Project Development Procedures Manual*. Pedestrian facilities proposed by non-Caltrans entities within Caltrans' access

1 This authority is delegated by the Chief, Division of Design.

controlled right of way shall also comply with Chapter 17 "Encroachments in Caltrans' Right of Way," also in the *Project Development Procedures Manual.*

In addition to incorporating the *Standard Plans* into projects affecting pedestrians, standards for design shall also include the following (note the State or Federal standards in parenthesis for exceptions):

Surface

All surfaces on an accessible route shall be stable, firm, and slip resistant (Federal). Irregular surface uniformity, whether intentional for decorative purposes or unintended by ground movement can cause problems for people with disabilities. On any accessible route, changes in level up to 6 mm may be vertical (Federal). Changes in level between 6 mm and 13 mm shall be beveled with a slope no greater than 1:2 (50%) (Federal). Changes in level greater than 13 mm shall be accomplished by means of a ramp (Federal).

Surface types on State right of way can vary due to the type of facility it serves. Normally, sidewalks are made of portland cement concrete, or in some situations asphalt concrete may be appropriate. Surface type selection is a decision that the designer has to consider. Design factors for surface materials of other facilities, such as cross slope and grade, can be found in *Designing Sidewalks and Trails for Access* published by the United States Department of Transportation.

The use of paving units, stamped concrete, or stamped asphalt concrete, although within the surface uniformity requirements of an accessible route, could lead to a vibration effect causing repeated jarring to a wheelchair user. No roughness index exists for walkways, as it does for roadway surfaces. Until such guidance becomes available, districts will have to exercise designer discretion or consult with the Project Development Coordinator or Traffic Operations. As a general rule, cobblestone or similar treatments should not be used.

If paving units are used, they must meet the specification requirements of the American Society for Testing and Materials (ASTM) C936.

All walkway surfaces shall have a broom finish texture or an equivalent. A broom finish surface is described in Section 73 of the current *Standard Specifications* (State). Regardless of surface type, if the walkway encroaches onto a roadway, as in the case of a crosswalk, the surface must have a coefficient of friction not less than 0.35 as determined by using California Test Method 342.

At present, no particular color requirement is prescribed in Federal guidelines. However, material used to provide contrast on detectable warnings on walkway surfaces should have a contrast by at least 70%. This is intended to assist the visually impaired pedestrian. This contrast is calculated by [(B1-B2)/B1] x 100, where B1=light reflectance value (LRV) of the lighter area, and B2=light reflectance value (LRV) of the darker area. Visual contrast can be quantified with a luminance meter that measures the amount of light reflected by each subject (where zero is total darkness and 100 is theoretical complete light reflection). This contrast may be used on elements of a walkway, such as to differentiate a curb ramp from the sidewalk, or the crosswalk from the rest of the pavement. Also, crosswalk or sidewalk surfacing shall not cause glare to the user. Note, colored pavement or paving units are not to be used in lieu of striping for marked crosswalks.

Vertical Clearance

Pedestrian pathways should provide for a vertical clearance of at least 2.1-m (Federal). Pedestrian pathways that are part of a shared facility, i.e., bicyclists and equestrians, shall follow the appropriate guidance in the *Highway Design Manual.* See "Shared Facilities" of these guidelines.

Width

The *Highway Design Manual* prescribes a sidewalk width advisory standard of at least 1.5 m. A sidewalk is the most common walkway that is constructed in State right of way. In many cases a local agency standard will provide greater accessibility than Caltrans' standard, in which case the local agency standard should be used.

The normal walkway minimum width of an accessible route should be at least 1.2 m (State). In places where constraints exist, a minimum continuous width of 915-mm (Federal) may be provided. For sidewalks, these widths can only be used if an exception to the advisory standard width in Index 105.1 (11) of the *Highway Design Manual* is obtained. At any point of an accessible route, 815 mm (Federal) must be provided as a minimum lateral clearance to an obstruction, i.e., a light standard.

In order to facilitate the wheelchair user, if an accessible route has less than 1.5-m clear width, then passing spaces at least 1.5 m by 1.5 m shall be located at reasonable intervals not to exceed 61 m (Federal).

Grade

The grade or slope of an accessible route should be as flat as possible. Any part of an accessible route with a slope greater than 1:20 (5%) shall be considered a ramp, and must comply with the standards of a ramp (Federal). See information on "Ramps" of these guidelines.

All walks with continuous gradients (up to 5%) shall have level areas at least 1.5 m in length at intervals of at least every 122-m (State).

The change of grade between two adjacent surfaces should not exceed 13 percent. For example, if a curb ramp has a slope of 8 percent and the adjoining gutter slopes opposite at 5 percent, the grade change is 13 percent. Excessive slope differences could cause wheelchair mobility problems.

A profile of pedestrian pathways should be developed to ensure compliance with grade and other design parameters.

Cross Slope

Drainage is always a design consideration for exterior facilities. Walkways shall be designed so that water will not accumulate on the surface. No more than a 1:50 (2%) cross slope shall be constructed on a walkway that is an accessible route (Federal).

Utilities

Utilities within pedestrian facilities or elements may be placed or remain in such provided that at least a lateral clearance equivalent to the minimum width of an accessible route is maintained. See "Width" of these guidelines.

Drainage Grates

Walks shall be free of grating whenever possible. If gratings are located in walks, then they shall have spaces no greater than 13 mm in one direction (Federal). If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel (Federal).

Ramps

Slopes that are greater than 1:20 (5%) will be considered ramps and must have landings every 760-mm rise (Federal). The maximum slope of a ramp should not exceed 1:12 (8.33%) (Federal). For existing conditions where constraints exist, or in the case of a historical resource/property, a maximum slope of 1:10 (10%) with landings every 152 mm rise (Federal), or a maximum slope of 1:8 (12.5%) with landings every 76 mm rise is allowed (Federal).

Curb ramps are the most common type of ramp. Different types of curb ramps have been approved and are contained in the *Standard Plans*. Gutters, road surfaces, etc., immediately adjacent to the curb ramp shall not exceed 1:20 (5%) (Federal). The ramp width shall be consistent with the width of an accessible route. The level landing at the top of the curb ramp should not be less than 1.2 m in length (Federal). The flared part of a curb ramp is not considered part of the accessible route. Flares are needed if the curb ramp is located where pedestrians must walk across the ramp (Federal). In general, for the flare, a maximum slope of 1:10 (10%) is used (Federal). However, if the level landing at the top of the curb ramp is less than 1.2 m, the slope of the flares shall not exceed 1:12 (8.33%) (Federal).

Curb ramps at crosswalk markings shall be wholly contained within the marking as shown in *Standard Plan* A88A Cases A and E. In the case of a single (diagonal) curb ramp with flared sides, they shall also have at least a 0.6 m long segment of straight curb located on each side of the curb ramp and within the marked crossing. If larger radius curb returns are used, the 0.6 m long segment standard is very hard to meet and may be technically infeasible. See "Review and Exceptions" of these guidelines for documenting the decision. The bottom of diagonal curb ramps should have a clearance to the crosswalk marking as shown in *Standard Plan* A88A Case E (State). However, where constraints exist, 1.2 m clearance may be used (Federal).

It is not necessary for curb ramps to be in line with the crosswalk, which may cause a skewed curb ramp position resulting in a wheelchair caster off the surface. More importantly, curb ramps should be constructed perpendicular to the curb face.

The cross slope of a sidewalk will determine the actual length of the curb ramp run, since anything more than a flat surface (no slope) will require more length to intercept the sidewalk surface. The following matrix can be used for design when the sidewalk has a 2% cross slope:

Height of Curb Face	**Ramp Run Length** (Plan)
100 mm	1.6 m
127 mm	2.0 m
150 mm	2.4 m
178 mm	2.8 m
190 mm	3.0 m
200 mm	3.2 m

Curved (or helical) ramps shall be subject to the same design standards as straight ramps. However, because of the complexity, curved ramps should not be constructed if a straight ramp can accomplish the same accessibility. If a curved ramp is sloped at the maximum 1:12 (8.33%), then the minimum radius needed is 14.6 m; otherwise, a smaller radius will compromise the maximum 2% cross slope and one caster of a wheelchair will be off the surface. The following matrix shows the minimum radius needed for a given ramp slope:

Slope	Minimum Radius Needed to Inner Side of Ramp
5%	8.8 m
8.33%	14.6 m

Medians and Islands

Raised medians or islands in street crossing paths shall be either cut through level with the street or have curb ramps and a level area at least 1.2 m long between curb ramps (Federal). Widths of cut through paths should be consistent with "Width" above. Since a cut through path is adjacent to traffic without a barrier, it must have a detectable warning surface as described below under "Detectable Warning Surface." The detectable warning surface width should be at least 600 mm as shown on *Standard Plan* A88B (State).

Handrails

If a ramp run has a rise greater than 150 mm or a horizontal projection greater than 1830 mm, then it shall have handrails on both sides. Handrails are not required on curb ramps. Handrails shall have the following features:

1. Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback or dogleg ramps shall always be continuous (Federal).
2. If handrails are not continuous, they shall extend at least 305 mm beyond the top and bottom of the ramp segment and shall be parallel with the ground surface (Federal).
3. The clear space between the handrail and the wall (if any) shall be 38 mm (Federal).
4. Gripping surfaces shall be continuous (Federal).
5. Top of handrail gripping surfaces shall be mounted between 865 mm and 965 mm above ramp surface (Federal).
6. Ends of handrails shall be either rounded or returned smoothly to floor, wall, or post (Federal).
7. Handrails shall not rotate within their fittings (Federal).

The grip portion shall not be less than 32 mm nor more than 38 mm, or the shape shall provide an equivalent gripping surface and all surfaces shall be smooth with no sharp corners (State).

Wheel Guides

A cue to indicate the edge of an accessible route may be needed. Where the ramp surface is not bounded by a wall or fence and the ramp exceeds 3 m in length, the ramp shall comply with one of the following requirements (State):

1. A guide curb a minimum of 50 mm in height shall be provided at each side of the ramp, or
2. A wheel guide rail shall be provided, centered 76 mm plus or minus 25 mm above the surface of the ramp

Landings

Landings shall occur at the bottom and top of each ramp. Landings shall be designed with the following widths/lengths:

1. The landing shall be at least as wide as the ramp leading to it. (Federal)
2. The landing length shall be at least 1.5 m (Federal). For curb ramp landings see "Ramps" of these guidelines.
3. If ramps change direction at a landing, the landing shall be at least 1.5 m by 1.5m. (Federal)
4. A bottom landing length shall be at least 1.8 m. (State)
5. Where a change of direction in excess of 30 degrees occurs at an intermediate or bottom landing, the length of the landing shall be at least 1.8 m. (State)

These guidelines do not discuss the situation where a door opens onto a landing at a building entrance. For this situation refer to the *California Building Code* Section 1003.3.4.4 and confer with the Office of Transportation Architecture in the Division of Structures Design.

Detectable Warning Surface

Detectable warnings shall consist of raised truncated domes as specified on *Standard Plan* A88A. This surface will be required on the curb ramp, as shown on that standard plan, when the curb ramp is flatter than 1:15 (6.67 %) (State). This surface shall be 600 mm wide (State).

Detectable warnings are also required where a walk crosses or adjoins a street, and where there is no curb or other barrier separation (Federal). This surface shall be 915 mm wide (Federal).

Grooves

Grooves shall consist of indentations at the top of a curb ramp as specified on *Standard Plan* A88A (State). The grooves shall form a 300-mm border at the level surface of the sidewalk (State).

SHARED FACILITIES

Pedestrian facilities that are part of nonmotorized transportation facilities, must be designed in accordance with the *Highway Design Manual* for the appropriate bikeway classification, and the *Designing Sidewalks and Trails for Access* for trails and equestrian design.

Designers of pedestrian-shared facilities must consider the geometric requirements that are most critical for the intended users. In some cases designing for pedestrians may govern the geometric features.

ALTERNATES STANDARDS

Federal regulations allow the use of other accessibility standards if it provides substantially equivalent or greater access to the facility system as the minimum Federal accessibility standards. A local agency's standard that provides equivalent or greater accessibility than the minimum Federal accessibility standard may be used in lieu of the minimum Federal standard.

PROGRAM ACCESSIBILITY

Caltrans' compliance with the ADA results in ensuring that people who have disabilities are not denied access to public programs; hence, the need to design pedestrian facilities in accordance with this document. However, in many situations, an operational solution may achieve program accessibility without the need for construction. Existing facilities do not have to be made accessible if other methods of providing access are effective. Nonconstruction approaches may include alternate accessible routings, relocating services or activities to accessible locations, or taking the service or benefit directly to the individual. Coordination with local agencies, transit agencies, or other affected entities may be required to achieve these strategies.